# Soviets Search for Eerie New Weapons

By William Kucewicz

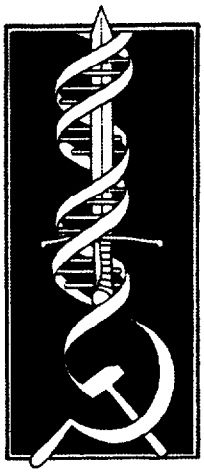
The two great scientific breakthroughs of our time are the splitting of the atom and the splicing of genes. As the physicists who deciphered the structure of the atom unlocked the secret of matter, the molecular biologists who deciphered the "double helix" of DNA unlocked the secret of life. Today, scientists are exploiting this knowledge to split and recombine genes, creating new biochemical compounds that already are providing commercial benefits and offer hope of great medical leaps such as curing cancer.

Almost every scientific breakthrough since the wheel, unhappily, has been turned to military purposes. In particular, the experience of atomic physicists stands as a lesson on how science can be more potent in war than in peace. And over the last two decades this lesson has agonized molecular biologists. Are these deep secrets of nature forbidden fruit? Nobel laureate Joshua Lederberg put the matter most eloquently at the Committee on Disarmament in 1970, citing "my own moral preoccupation with whether my own career will have been labeled a blessing or a curse to the humanity from which I spring."

The worst fears of molecular biologists may soon be realized. A seven-month investigation by The Wall Street Journal reveals that the Soviet Union is engaged in an intensive research program focused on using the revolutionary techniques of recombinant DNA to create a new generation of germ-warfare agents.

DNA, or deoxyribonucleic acid, is the

**BEYOND 'YELLOW RAIN'**



**THE THREAT OF SOVIET GENETIC ENGINEERING**

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blueprint that holds the genetic instructions that form every living thing. The so-called "gene age" began in the early 1970s when scientists at Stanford University discovered how to separate the parts of the long-chain DNA molecule called genes and then combine them into a different DNA molecule.

Evidence that the Soviets are using recombinant DNA technology for military purposes rests foremost on interviews with a number of former Soviet scientists now living in the U.S., several of whom were directly involved in microbiology. They describe the program in convincing detail, identifying three specialized laboratories—near Moscow, Leningrad and Novosibirsk—that are working on the military application of genetic engineering. In at least one case, Soviet scientists were attempting to recombine the venom-producing genes from cobra snakes with ordinary viruses and bacteria; such an organism would infect the body and surreptitiously produce paralytic cobra neurotoxin. The former Soviet scientists also described a joint operation of the gene-warfare program by the military and the Soviet Academy of Sciences, with the full support of Kremlin leadership.

The emigre testimony is corroborated by a review of Soviet scientific literature. Russian scientists have placed a heavy emphasis on studying the genetic structure and impact of neurotoxins such as snake venoms. While this research could be passed off as merely basic scientific inquiry, it is also ideally suited to developing new biological warfare agents. Soviet military literature, meanwhile, stresses the effectiveness and reliability of such weapons due to the advances of biotechnology and describes how these germ weapons might be used in combat or for "sabotage purposes."

*"The most efficient means for removing man from the planet."*

The Soviet Union has placed a strong emphasis on development of chemical and biological weapons ever since World War I, when about a half-million Russians fell victim to German gas attacks. Lenin established the country's first bacteriological weapons institute in 1919, and work on chemical and biological warfare has progressed unceasingly.

"Yellow rain," of course, is the best-known demonstration of the active Soviet biochemical military program. In 1975, the Soviet Union's allies in Southeast Asia began using these deadly mycotoxins against the primitive Hmong tribe in Laos, and used them later in Cambodia. Since then, the Soviets apparently have employed the mycotoxins in their own war in Afghanistan. Most recently, the mycotoxins have been identified in blood and urine samples from Iranian victims of the fighting with Iraq, where the use of mustard gas and nerve agents has been discovered. There also have been numerous reports of a major accident at a Soviet biological-weapons facility in Sverdlovsk; in 1979, an explosion at the facility apparently released anthrax spores into the atmosphere, killing about 1,000 soldiers and civilians.

Neither U.S. experts nor Soviet emigres charge that genetically engineered weapons are ready for battlefield use. Afghan freedom fighters have reported bizarre symptoms—hours-long incapacitation, death so sudden it leaves victims frozen in place, rapid decomposition of bodies—that suggest previously unknown chemical agents. But the reports are sketchy, and new agents could be the result of conventional chemical or biological research. The former Soviet scientists left the Soviet Union during the emigration of the late 1970s, and they say that to the best of their knowledge the secret laboratories hadn't yet managed to recombine a new germ weapon. Emigration has since stopped. U.S. intelligence continues to try to monitor developments but does not know how far the Soviet program has advanced.

Genetic engineering seems a natural and almost inevitable next step in the Soviet biochemical-weapons program. The Soviet Union admits as much in the latest edition of its Military Encyclopedia: "Achievements in biology and related sciences (biochemistry, biophysics, molecular biology, genetics, microbiology and experimental aerobiology) have led to an increase in the effectiveness of biological agents as a means of conducting warfare. Improved methods of obtaining and using them have resulted in a qualitative reexamination of the very concept of 'biological weapons.'"

The evidence of a Soviet gene-warfare program has recently become persuasive enough for the U.S. government to go public with its concerns. Defense Secretary Caspar Weinberger made the first official comment on the Soviet efforts in biotechnology warfare on April 10 with the publication of the third annual edition of "Soviet Military Power." "Soviet research efforts in the area of genetic engineering may also have a connection with their biological warfare program," the Weinberger report says. "There is an apparent effort on the part of the Soviets to transfer selected aspects of genetic engineering research to their biological warfare centers."

"For biological warfare purposes, genetic engineering could open a large number of possibilities," the report adds. "Normally harmless, non-disease-producing organisms could be modified to become highly toxic or produce diseases for which an opponent has no known treatment or cure. Other agents, now considered too unstable for storage or biological warfare applications, could be changed sufficiently to be an effective agent. In Soviet doctrine, the biological weapon is seen as a strategic weapon for the spread of infectious disease. Many of the Soviet long- and intermediate-range missile systems are technically capable of disseminating large quantities of disease agents over large areas."

Indeed, genetic engineering could carry mind-boggling military potential. An aggressor armed with such new biological weapons could, for example, vaccinate its own armed forces and population against this new disease, leaving them the only survivors of a world-wide plague. Another nation could be attacked surreptitiously; who could tell whether a new epidemic was natural or the result of biological warfare? Economic warfare could be waged by unleashing new plant diseases attacking only certain crops, like rice or corn.

And while technology for atomic weapons is complex and expensive, genetic technology is becoming relatively simple and cheap; even terrorist nations, like Libya, might be able to create their own new weapons. And because viruses tend to mutate spontaneously, a new military organism might leap out of control of its inventors, wreaking world-wide catastrophe. Even its peaceful applications have engendered fear of a genetic accident unleashing an epidemic of some hitherto unknown disease against which mankind would have no immunity. While this fear has generally been regarded by scientists as far overdone, it's clear that the dangers would be considerably greater as a result of research deliberately aimed at creating new diseases.

Mindful of the dangers of biological warfare, many scientists urged an international treaty to ban such weapons. President Richard Nixon took the unilateral step in late 1969 of renouncing all methods of biological (and later toxin) warfare, and set about destroying America's existing stockpiles and closing down the research into the offensive use of such weapons.

## International Agreement

This was followed in 1972 by international agreement on the Biological Weapons Convention. It outlawed the development of biological and toxin weapons and banned the acquisition or maintenance of stocks of warfare agents "of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes."

The Soviet gene-warfare program has profound implications even beyond the violation of an international treaty. Biological warfare, Prof. Lederberg said in his Disarmament Committee address, "stands apart from all other devices in the actual threat that it poses to the health and life-expectancy of every human being whether or not he is politically involved in belligerent actions."

Prof. Lederberg said in 1970 that "scientific breakthroughs of a rather predictable kind" could lead to genetically altered infective agents "against which no credible defense is possible." It now appears such weapons are being developed in earnest by the Soviet Union, and that threat perhaps someday may rival even nuclear war. Indeed, Nobel laureate Lederberg warned that biological weapons "could well become the most efficient means for removing man from the planet."

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